


PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference G69054.GL.cp	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/14707	International filing date (day/month/year) 22.12.2003	Priority date (day/month/year) 10.01.2003
International Patent Classification (IPC) or both national classification and IPC E06B3/48		
Applicant CORSARO & LISCO FERROPROFILI S.P.A. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:
- I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 07.07.2004	Date of completion of this report 04.05.2005
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Merz, W Telephone No. +49 89 2399-7359



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International application No. PCT/EP 03/14707

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

3-7 as originally filed
1, 1a, 2 received on 04.02.2005 with letter of 02.02.2005

Claims, Numbers

1-8 received on 07.07.2004 with letter of 06.07.2004

Drawings, Sheets

1/9-9/9 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-8
	No: Claims	
Inventive step (IS)	Yes: Claims	1-8
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-8
	No: Claims	

2. Citations and explanations

see separate sheet

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Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

5.1 The following documents are cited in the International Search Report:

- D1:** EP-A-0 623 724 (SCHIJF HENDRIKUS JOHANNES) 9 November 1994
- D2:** DE 44 14 812 C (GUMPP MARTIN) 9 November 1995
- D3:** US-A-3 546 845 (KEMPEL JOHN J) 15 December 1970
- D4:** FR-A-2 045 563 (PEIGNEN HENRI) 5 March 1971
- D5:** US-A-4 924 932 (ESNAULT PAUL) 15 May 1990
- D6:** EP-A-0 370 324 (HOERMANN KG) 30 May 1990

5.2 The document **D1** is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):
a panel (1, 1') for sectional doors, comprising
· a first profiled metal plate (2) and a second profiled metal plate (2'), connected together to form an interspace, filled with an insulant, such as foamed polyurethane, and presenting a body having
a) a first longitudinal end having a more outer substantially circular profile part (14) and a more inner narrow connecting part (15,16), and
b) a second longitudinal end opposite the first and presenting a recess (13) of substantially circular narrow-mouthed shape (cf. Fig. 1,2),
· arranged to matchingly receive said more outer part (14) of another panel having identical ends such as to couple and hinge the panels (1) together by simply inserting them manually and thrusting them in the direction of the panel height,

5.2.1 The subject-matter of claim 1 differs from this known panel in that

- the recess (8) is
· centered on the medium plane of the panel (1, 1') and
· symmetrical to said medium plane.

Remark:

Document **D4** (cf. Fig 4) shows a hinge (Fig. 2,3) which is located at the center plane of the panel (cf. claim 1, line 13) but the recess (30) itself is asymmetrical.

5.3 The subject-matter of claim 1 is therefore **new** (Article 33(2) PCT).

5.4 The problem to be solved by the present invention may be regarded as to increase the

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durability of the panels

- 5.5 The solution to this problem proposed in claim 1 of the present application is considered as involving an **inventive** step (Article 33(3) PCT) for the following reasons:
By centering the recess for the hinge at the medium plane of the panel equilibrium between two consecutive panels is achieved. The resulting symmetrical strain leads to an increased lifetime of the panel construction.
Even if the skilled person would apply the teaching of **D4** to the panel according to **D1** it would not lead to the solution according to the subject matter of claim 1 with its recess (8) symmetrical to the medium plane.
- 5.6 Claims **2-7** are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.
- 5.7 The subject matter of independent claim **8** concerns the use of a panel as claimed in the preceding claims for forming a sectional door. Therefore the claimed subject matter also meets the requirements of the PCT with respect to novelty and inventive step.
- 5.8 The subject matter according to any of claims 1-8 is industrially applicable.

PANEL FOR SECTIONAL DOORS

The present invention relates to a panel for sectional doors.

Sectional doors today represent the maximum quality standard for closing an access space to a residential or industrial building.

Panels for sectional doors are currently formed from two suitably profiled metal plates sandwiched together and enclosing foamed polyurethane as insulating agent.

The panels are generally hinged together using intermediate and/or lateral

hinges mounted on the ends of the panels by suitable fixing means.

The drawbacks of current panels for sectional doors are the following:

- the hinges fixing the panels together are subjected to tensile, bending, shear and torsional stresses during door operation, and transmit these stresses to the fixing means which consequently require constant maintenance and constitute a critical point, particularly under the action of the wind;

- to enable the hinging of two consecutive doors to rotate perfectly, the centres of rotation of the various hinges positioned along it must be concentric and aligned. Said alignment is difficult to achieve in situ, and even if attainable it would be imperfect because of the stresses existing on the door, and hence on the panels, during its operation. For this reason, hinging is always imperfect, this imperfection resulting with the passage of time in undesirable creaking during movement of the door wing while opening or closing the door;

- equilibrium on the points of contact between two consecutive panels is generally unstable, because of the fact that the contact zone between them is not symmetrical about the hinging centre of the hinges, so generating anti-aesthetic curvatures and lack of alignment of the panel profiles in the longitudinal direction, which become appreciably greater as the panel length increases;

- the production, assembly and installation times of current panels are lengthy, making these operations costly because of the presence of said intermediate fixing hinges, of which at least three in number with four screws each are present for each pair of panels.

~~The drawbacks of the known art are apparent from the aforestated considerations, particularly as current panels do not fully satisfy the requirements of ease of installation and reliability with time.~~

EP-A-0623724 discloses a panel for sectional doors in which the adjacent panels are hinged together by means of hinge parts forming part of the panel. The latter has in fact a first longitudinal end having a more outer circular profile part and a second longitudinal end opposite to the first and having a recess of circular narrow-mouthed shape arranged to matchingly receive said circular profile part of another panel having identical ends such as to couple and hinge the panels together. Said circular profiled part and circular recess have the same center which is offset to the medium plane of each panel. To insert the circular profile part of a panel in the circular recess of an adjacent panel it is necessary that the medium planes of the two panels form a suitable angle.

In FR-A-2045563 a sliding-folding door is disclosed, which comprises a plurality of panels, each panel being hinged to the adjacent one in a manner similar to that for hinging the panels in EP-A-0623724. However in FR-A-2045563 each panel can rotate around a vertical axis which lies in the medium plane of the panel. Also in this case, for rotatably coupling two adjacent panels it is necessary that the medium planes of the two panels form a suitable angle.

The drawbacks of the known art are apparent from the aforesaid considerations, particularly as current panels do not fully satisfy the requirements of ease of installation and reliability with time.

The main object of the present invention is to provide a panel for sectional doors, in which the hinging between adjacent panels does not depend on appropriate hinges fixed to the panels.

In a first embodiment, the present invention provides a panel 1 for sectional doors, comprising a profiled outer metal plate and a profiled inner metal plate, connected together to form an interspace occupied by an insulating means, such as foamed polyurethane, characterised by presenting: a first longitudinal end having a more outer substantially circular profile part and a more inner narrow connecting part, and a second longitudinal end opposite the first and presenting a substantially circular narrow-mouthed recess arranged to receive said more outer part of another panel having identical ends such as to couple and hinge the panels together.

In a second embodiment of the invention, the panel is formed from extruded profile bars, one of which forms the first longitudinal end having a more outer part of substantially circular profile and a more inner narrow connecting part, second extruded profile bar forming the second longitudinal end opposite the first and presenting a narrow-mouthed substantially circular recess.

The characteristics of the invention will be more apparent from the ensuing description and from the accompanying drawings relative to some embodiments of a non-limiting character, in which:

Figures 1^A and 1^B show a first preferred embodiment of the panel in sectional view, assembled and decomposed into its component elements respectively;

Figures 2A, B, C are sectional views with relative external prospects of three respective preferred configurations of the panels of Figure 1;

Figure 3 is a section showing the particular shape of the ends of the panel of Figure 1, together with a section through an anti-friction half-ring which can be incorporated into the panel;

Figures 4A, B, C show respectively two sections and a front view relative to the modalities of assembly of the anti-friction half-rings;

Figures 5A, B are a section and a front view showing the modalities of assembly of two consecutive panels of Figure 1;

Figures 6A, B, C are three sections through that part of the upper ends coupled to two consecutive panels, shown respectively in the normal position, in a position inclined at $\pi/6$ radians and in a position inclined at $\pi/3$ radians;

Figures 7A, B and C are respective sections through another preferred

CLAIMS

1. A panel (1, 1') for sectional doors, comprising a first profiled metal plate (2) and a second profiled metal plate (4), connected together to form an interspace (3), filled with an insulant, such as foamed polyurethane, and presenting a body having:
- a) a first longitudinal end (6) having a more outer substantially circular profile part (5) and a more inner narrow connecting part (10, 11, 17, 18, 19), and
- b) a second longitudinal end (7) opposite the first (6) and presenting a recess (8) of substantially circular narrow-mouthed shape (8A), centered on the medium plane of the panel (1, 1') and arranged to matchingly receive said more outer part (5) of another panel having identical ends such as to couple and hinge the panels (1) together by simply inserting them manually and thrusting them in the direction of the panel height, characterised in that the recess (8) is symmetrical to said medium plane.
2. A panel (1) for sectional doors as claimed in claim 1, characterised in that its first longitudinal end (16) is obtained by the union of two circumferential arcs (12) and (16) of the profiled plates joined together by means of a pair of tabs (13, 14) and radius-joined to the body of the panel by the shaped connection portions (10-11 and 17-18-19).
3. A panel (1) for sectional doors as claimed in claim 1, characterised in that that end (7) provided with the recess (8) is formed by the union of two circumferential arcs (24) and (28) joined together by means of a pair of tabs (26, 27), and radius-joined to the lower end of the panel (7) by a plurality of portions of shaped fixing profiles (20-21-22-23 and 29-30-31-32).
4. A panel (1) for sectional doors as claimed in claim 1, characterised in that said shaped fixing profile portions (20-21-22-23 and 29-30-31-32) present at said second end (7) are shaped such that the initial portions (22-23 and 29-30) forming the access mouth are positioned below the centre (25) of said recess (8) and have a minimum distance apart which is less than the diameter of the circumference of the more outer part (5), to embrace said part (5) when inserted and prevent its easy disengagement during normal operation of the sectional door.
5. A panel (1) for sectional doors as claimed in claim 1, characterised in that said more outer part (5) is slightly inclined towards the interior of the space closed by the sectional door, to prevent, when in said position, squashing of the fingers by the outside of the door, between a shaped fixing profile portion (20-21) of the second end (7) and the radius-joining profile (10-11) of the first upper

end (6), during their mutual rotation.

6. A panel (1) for sectional doors as claimed in claim 1, characterised in that said more outer part 5 is inclined towards the interior of the space closed by the sectional door, in said position preventing squashing of the fingers by the inside of the door, between the shaped fixing profile portion (31-32) of the lower end (7) and the internal radius-joining profile (17-18-19) of the upper end (6) during their mutual rotation, said squashing of the fingers being prevented until the angle between the panels is $\pi/6$ radians, said contained angle assuming at a maximum the value of $\pi/3$ radians, at which contained angle said profiles (31-32) and (17-18-19) already abut against each other, so preventing their further mutual rotation and ensuring that the panels (1) cannot possibly fall.

7. A panel (1) for sectional doors as claimed in claim 1, characterised in that a plurality of half-rings (9) of self-lubricating material can be inserted into the recess (8, 38) by simple manual push-fitting in the direction of the panel height, spaced apart by a distance approximately equal to the height of the panel (1).

8. A sectional door formed from panels in accordance with one or more of the preceding claims.